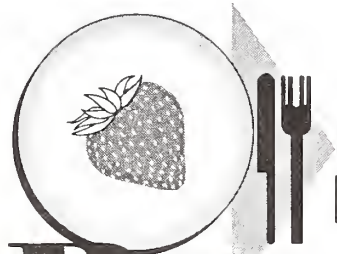


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Food & Nutrition Research Briefs

TV Eating Up Family Mealtime

A generation of “TV-dinner” kids might be learning their eating habits from Homer Simpson, according to a one-week survey of 287 fourth-, fifth- and sixth-graders in the Houston area. More than 42 percent of the dinners they ate at home were consumed while watching television. Overweight children in the survey reported eating 50 percent of their dinner meals in front of the television, compared to just 35 percent by normal-weight children.

African-American and Mexican-American children—two groups known to be at-risk for weight problems—reported the greatest number of dinner meals eaten while watching television: 62 and 43 percent, respectively. Asian-American children reported the fewest—21 percent—while Euro-American kids reported eating 32 percent of their dinner meals while watching television.

The researcher—a behavioral nutritionist—finds this troubling because family meals are important for children, from both a nutritional and a developmental standpoint. There’s a known association between the number of hours children spend watching television and weight problems. Those who watch television while eating also tend to be unaware of how much they eat, which encourages overeating. And studies show children tend to request food products that are more frequently advertised on television—most of which are low in nutritional value.

What’s more, food commercials often suggest the use of food for purposes like fun or “image” rather than to satisfy hunger or be healthy, and seldom show how the advertised food fits into a healthy diet. By contrast, research suggests that children who eat dinner with their parents tend to eat healthier, consuming less saturated fat and more of several important nutrients than their unsupervised peers. Positive family mealtime conversations can also build children’s self-esteem and foster positive relationships that help children and parents talk through tough issues when they arise.

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Food-Policing Parents Can Put Kids on Guilt-Trip

Parents who tightly control what their children eat actually might be promoting a preference for off-limit foods and a less-than-healthy relationship with food. A recent study showed that daughters of parents with the most restrictive food practices were more likely to overeat when left free to choose tasty snacks than those whose parents had a more relaxed approach. And the more a child felt restricted, the more negative feelings she expressed about having eaten snacks.

The researcher studied nearly 200 5-year-old European-American girls and their parents to determine whether restrictive child feeding practices affect the way children learn to evaluate their own eating behavior. First, she measured parental restriction by determining how much access each parent typically gave their child to the 10 snack foods used in the study. Children’s perception of parental restriction was also assessed and scored.

Next, each child was given a filling lunch and was then left alone for 10 minutes in an observation room with toys and large bowls of 10 desirable snacks—including chocolate bars, potato chips, ice cream and fruit candies. Afterwards, the researcher asked each child if the amount of snack foods she’d eaten was too little, just enough, or too much and how she felt about her snack eating. She also measured each child’s actual consumption.

In the absence of hunger, the girls ate an average of 123 calories in snack foods. Roughly half reported eating “too much” and feeling bad about eating at least one or more of the snack foods. Approximately one-third said that they would feel bad if their mother or father found out about what they had eaten. The girls’ negative evaluations reflected their perception that their parents restricted these snacks rather than how much they actually ate. The more restriction felt, the more a child tended to eat, the researcher reported in the *Journal of the American Dietetic Association*, 2000 (vol 100, pp. 1341-1346).

She concludes that, while parents should be responsible for deciding what types of foods are appropriate to bring

home, allowing children to be active participants in their own eating decisions is equally important. A less restrictive approach, which includes high-fat, high-sugar foods as part of a well-varied diet, could be better for helping young girls stay in touch with their own fullness cues and maintain a healthy view of their own eating.

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Lift Weights To Lift Aging Metabolism

A comprehensive new study might allay any lingering debate about why metabolism slows as people age. The findings show that the gradual loss of body cells, especially those high-energy-consuming muscle cells, can help explain why older people burn fewer calories while at rest—which so often leads to creeping weight gain.

Some scientists have suggested that changes in hormones, immune function or other factors may depress resting metabolism with aging. But this study—published in the *Journal of Gerontology: Medical Sciences*, 2000 (vol. 55A, pp. M757-760)—showed a direct association between metabolic rate and cell mass, also known as lean- or fat-free mass. And that means that older people may regain some of their youthful resting metabolic rate and get off the slow boat to obesity by regular muscle-building exercises. Increasing muscle mass would help seniors, according to the researchers.

They analyzed measurements of body composition and resting metabolic rate for 131 healthy men and women taken over a five-year period at the Boston center. The subjects ranged in age from 18 to 87, giving the researchers a broad sample for detecting small changes in cell mass across the years. But they found that only one of the six methods used to measure the subjects' body composition exposed the decline in cell mass occurring with age. That was a high-tech method for measuring the body's total potassium—a mineral found almost entirely inside of cells.

Related studies at the center further support an age-related loss of cell mass. Researchers found a definite decline in muscle mass of middle-aged and senior men and women over 10- and 12-year periods when they measured the subjects' leg muscles by computerized tomography—or CAT scan. The shrinkage of muscle tissue explained at least half of the subjects' loss of strength in those muscles.

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Fruit, Vegetable Films Keep Food Fresh and Tasty

Edible films made from pureed fruits and vegetables can add shelf-life and tantalizing new flavors to lightly processed foods such as cut produce. Some films also contain Food and Drug Administration-approved oils and antioxidants.

An ARS food technologist developed the films from produce like apples, oranges, carrots and strawberries. When applied to cut apples, the thin opaque films they controlled browning and prevented moisture loss better than several types of coatings.

An added benefit: The films could provide new flavor combinations, such as a strawberry film on cut bananas or an apple glaze on pork. Sheets of pureed fruit have long been available as snack foods. But this researcher is the first to explore produce-based films to enhance storage and flavor. ARS has applied for a patent on the edible films.

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Monitoring Muscle Mass Changes in AIDS Patients

A fast, gentle procedure called bioimpedance spectroscopy, or BIS, may help physicians monitor treatments designed to stop muscle loss, also called wasting. ARS nutrition researchers have pioneered the use of BIS with healthy volunteers to measure body composition—the amount of fat versus lean tissue, including muscle, in our bodies. Fat-to-lean ratios are regarded as one of the best indicators of our health, and are directly influenced by eating and exercise.

In a study led by researchers from the University of California's San Francisco and Berkeley campuses, ARS scientists showed that BIS can be used to gauge whether specific medication and exercise regimens stop muscle loss in AIDS patients. BIS takes only a few minutes and involves sending a harmless electrical current, at a range of frequencies, from electrodes placed on the wrists and feet of the volunteer.

BIS was just as accurate, but faster, easier, and less costly than two other approaches—DEXA (dual-energy X-ray absorptiometry) and deuterium oxide dilution. The findings, reported in *AIDS*, 1999 (vol. 13, pp. 241-248), suggest that BIS could also be used to monitor muscle mass in other wasting diseases including cancer and tuberculosis.

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Some Broccoli Is Better at Chemoprotection

The potential of different lines of broccoli to stimulate a key enzyme that may protect against certain cancers can vary greatly, according to a first-of-its kind study by ARS scientists in Charleston, S.C., and researchers at Johns Hopkins University's School of Medicine in Baltimore, Md. The scientists evaluated a diverse collection of broccoli breeding lines.

Broccoli florets and young seedlings are rich sources of glucoraphanin and its breakdown product, sulforaphane. The latter compound is a potent inducer of an enzyme that detoxifies cancer-causing compounds and inhibits early tumor growth in rodent models. ARS scientists grew 71 USDA breeding lines of broccoli and five commercial hybrids in the field and then took extracts from each one. Johns Hopkins researchers measured glucoraphanin levels in these extracts and also measured their ability to induce enzyme activity in a "test-tube" assay.

Among the 76 broccoli varieties evaluated, the scientists found a 30-fold variation in both glucoraphanin levels and enzyme-induction potential. This suggests that enzyme induction may be used to gauge a broccoli line's anti-cancer potential. At least some of the observed variation is genetic in nature, the scientists concluded, and breeders could exploit it to develop new varieties with greater levels of the protective compounds. Eating such improved broccoli might stimulate an enhanced chemoprotective response against cancer development.

Studies have shown that people who eat cruciferous vegetables like broccoli have a lower incidence of colon and rectal cancers. Occurring in two out of 1,000 people, these account for 15 percent of all cancer deaths.

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Safer Ground Beef From a Shock Wave?

A process to make meat more tender may also make it safer to eat. New studies show that the ARS-developed Hydrodynamic Pressure Process (HDP) also reduces human pathogens in meat. In the process, meat is placed in a container of water, then a small amount of explosive is detonated to create a shock wave in the water. The shock wave tenderizes meat by severing the stringy striations that can make meat tough.

The scientists refined the process using a metal, thick-walled tank imbedded in the ground. While that didn't tenderize the meat as well as using disposable plastic containers, there seemed to be fewer bacteria on the meat

than before. So they conducted studies on ground beef to determine the effect of HDP on naturally occurring spoilage, or shelf-life, bacteria. The studies produced a "three-log" reduction in shelf-life bacteria. This equates to reducing 30,000 colony-forming units (cfu's) to 30 cfu's. A five-log reduction is the "gold standard" for bacterial reduction, so tests are ongoing to further reduce bacterial levels.

Subsequent studies to reduce the human pathogen *Escherichia coli* O157:H7 in fresh ground beef again produced encouraging results. Ground beef that had been seeded with *E. coli* O157:H7 had no detectable levels of the dangerous organism after HDP treatment. HDP seems to inactivate most meat pathogens, such as *E. coli*, but doesn't kill all bacteria, including the good *Lactobacilli*. Further studies are needed to determine if HDP can be put to practical use in a commercial setting.

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Bone Gains Fade When Elders Cease Supplements

Do seniors maintain strong bones after they stop taking calcium and vitamin D supplements? Researchers asked this question after showing that men and women over 65 who took extra calcium and vitamin D daily for three years either gained or retained bone throughout the body and specifically in the spine and hip—two areas prone to fracture in elders.

Unfortunately, the benefits didn't last. Two years after the volunteers stopped taking the required 500 milligrams of calcium and 700 International Units of vitamin D daily, they had lost any supplement-related benefits to the spine and hip, the researchers reported in the *American Journal of Clinical Nutrition*, 2000 (vol. 72, pp. 745-750). That's troublesome because fewer than one in 10 U.S. elders meet the current recommendations for calcium and vitamin D. These are set at a total daily intake of 1,200 milligrams of calcium from food and supplements and 400 to 600 I.U. of vitamin D.

Of the 389 volunteers in the original study, 295 remained in the two-year follow-up, returning to the center once a year for bone measurements and other tests. They no longer took calcium and vitamin D provided by the study—although, for ethical reasons, they were allowed to take their own supplements. Close to two-thirds of the women and about half the men chose to take some supplemental calcium during the follow-up. Vitamin D use was a little lower. But the self-selected supplements had no impact on the results, perhaps because the amounts taken were less than half the study levels, and use was not regular.

For more information, contact Bess Dawson-Hughes, (617) 556-3064, Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, MA; hughesb@hnrc.tufts.edu

Low-Phytate Corn Raises Zinc Absorption

A new kind of corn, developed by an ARS researcher, may help ensure that people get more of the zinc they need for good health. The new corn has about 65 percent less phytic acid, also known as phytate, than conventional corn. That's a plus because phytate can interfere with the body's ability to absorb certain nutrients—including zinc, an essential mineral.

Physicians and scientists from the University of Colorado Health Sciences Center in Denver, and an ARS geneticist in Aberdeen, Idaho, collaborated on the study to test the body's ability to absorb zinc from the low-phytate corn. Five healthy volunteers, age 23 to 39, ate menus featuring polenta, a cooked, coarse cornmeal, for two days. Cornmeal from the low-phytate corn was used to make the polenta one day, and cornmeal from conventional corn was used the next. Both kinds of cornmeal were spiked with a stable isotope of zinc that can be easily detected by laboratory instruments.

Analysis of fecal samples showed that the volunteers absorbed about 78 percent more zinc, on average, from the low-phytate corn than from the conventional corn. The Colorado researchers used the findings as the basis of a larger, follow-up study with Guatemalan villagers.

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Learning To Keep Tabs on Dioxins

ARS scientists are making the job of monitoring food, livestock feed and other materials less expensive for a group of toxic chemicals called dioxins. The scientists have reduced the cost of dioxin analysis from nearly \$2,000 per sample seven years ago to about \$600 to \$800. And they are developing an even more efficient procedure that requires minimal use of chemical solvents and is expected to reduce the current cost by half.

Produced by both natural and industrial processes, dioxins are chlorinated aromatic compounds that can build up in the fat of humans and animals and may increase the risk of tumors and have other undesirable health effects. The most likely exposure routes may involve food products from animals that have eaten feed contaminated by the fat-soluble chemical.

At the request of the U.S. Environmental Protection Agency, USDA began a fact-finding mission to investigate the extent of dioxin contamination in livestock from all sources. ARS scientists researched dioxins in beef produced in 13 states. Nearly all the samples were clean, with some outstanding exceptions in the kidney fat of some individual carcasses. These came from animals raised in barns or pens containing posts that had been treated with dioxin-containing pentachlorophenol (penta) to prevent rotting.

Now, EPA regulations ban penta-containing wood preservatives in fence posts or feeding troughs in barns. And penta that is registered for sale in the United States for uses such as preserving utility poles now must be manufactured under conditions that do not produce the most toxic dioxin and minimize the concentration of a related compound.

USDA's Food Safety and Inspection Service is again surveying meats for dioxin contamination to get a better picture of the background levels in the U.S. food supply.

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